

1 CLAIM (Listing):

2 Claim1 (currently amended). A plasma reformer for dissociating water and  
3 hydrocarbon fuel in a preheated gaseous form comprising:  
4 a turbulent heating zone containing micro-porous articulated material with a first  
5 impervious ceramic wall laterally bounding it;  
6 a reaction chamber downstream from the turbulent heating zone, the reaction  
7 chamber having emitter electrode means attached to the first impervious ceramic wall  
8 laterally bounding it, an inner lateral wall containing collector electrode means, and an  
9 electric circuit maintained between the emitter electrode means and the collector electrode  
10 means;  
11 an energy retaining zone containing micro-porous articulated material arrayed  
12 downstream from the reaction chamber;  
13 low thermal conductivity materials surrounding the energy retaining zone;  
14 compression-expansion cushion mat material surrounding the low thermal  
15 conductivity material;  
16 an ion-neutralization filter surrounding the collector electrode means in the reaction  
17 chamber;

18 a casing; and

19 Ingress means ~~for introducing gaseous material in a flow~~ into the turbulent heating  
20 zone and egress means ~~for removing a reformat stream~~ from the energy retaining zone.

21 Claim 2 (currently amended). A plasma reformer as set forth in Claim ~~[[1]]~~ 18  
22 wherein the emitter electrode means have a multiplicity of thin needle-like extrusions.

23 Claim 3 (original). A plasma reformer as set forth in Claim 2 wherein the needle-  
24 like extrusions have diameters between 1 nanometer and 100 micrometers.

25 Claim 4 (currently amended). A plasma reformer as set forth in Claim 3 wherein  
26 the emitter and collector electrode means are a metal selected from ~~[[a]]~~ the group  
27 consisting of tungsten, zirconium, titanium, molybdenum, and alloys thereof.

28 Claim 5 (canceled). A plasma reformer as set forth in Claim 4 further comprising  
29 an ion neutralizing filter surrounding the collector electrode in the reaction chamber.

1           Claim 6. (currently amended) A plasma reformer as set forth in Claim [[5]] 4  
2 further comprising a second ceramic wall laterally surrounding the energy retaining zone  
3 and inside of the low thermal conductivity material.

4           Claim 7. (currently amended) A plasma reformer as set forth in Claim 6 wherein  
5 the material in the turbulent heating zone and the energy retaining zone have micro-porous  
6 structure layers selected from [[a]] the group consisting of alumina, silica, mullite, titanate,  
7 spinel, zirconia, or some combination thereof.

8           Claim 8. (original) A plasma reformer as set forth in Claim 7 wherein the low  
9 conductivity materials are vacuum form fibers arrayed interior to fiber blankets, the vacuum  
10 form fibers having a greater density and a higher percentage of higher melting point material  
11 than the fiber blankets.

12           Claim 9. (currently amended) A plasma reformer as set forth in Claim 8 wherein the  
13 compression-expansion cushion mat material is low thermal conductive material ~~having a~~  
14 ~~great capacity of absorbing thermal compression-expansion, shocks and vibrations and~~  
15 ~~having the ability of sealing and protecting reformer material.~~

16           Claim 10. (currently amended) A plasma reformer as set forth in Claim [[5]] 1  
17 wherein the ~~ion-neutralizing~~ ion-neutralization filter material is a semiconductor.

18           Claim 11. (currently amended) A plasma reformer as set forth in Claim [[5]] 1  
19 wherein the ~~ion-neutralizing~~ ion-neutralization filter material is a ceramic alloy.

20           Claim 12. (currently amended) A plasma reformer as set forth in Claim 1 wherein  
21 ~~each~~ there are plural electric [[circuits]] circuit is connected to a different electricity source.

22           Claim 13. (currently amended) A plasma reformer as set forth in Claim 1 wherein  
23 the ingress means ~~for introducing gaseous material in a flow into~~ the turbulent heating zone  
24 and the egress means ~~for removing a reformat stream from~~ the energy retaining zone are  
25 double-walled tubes have an inner wall of a ceramic material and an outer wall of stainless  
26 steel.

27           Claim 14. (withdrawn) A process for reforming a preheated gaseous mixture of H<sub>2</sub>O  
28 and hydrocarbon fuels to produce hydrogen comprising:

29           further heating and mixing the mixture in a turbulent heating zone;

1 dissociating the H<sub>2</sub>O through ionizing and dissociating the hydrocarbon fuel through  
2 ionization and heat in a reaction chamber having emitter electrodes means in an outer wall,  
3 central collector electrode means, electric circuits maintained between the emitter electrode  
4 means and the collector electrode means causing copious numbers of high energy electron to  
5 be emitted from the emitter electrode to interact with the hydrocarbon fuel thereby  
6 dissociating the hydrocarbon fuel and forming low energy electrons that dissociate H<sub>2</sub>O; and  
7 further dissociating products leaving the reaction chamber in an energy retaining  
8 zone.

9 Claim 15. (withdrawn) A process as set forth in Claim 14 wherein the emitter  
10 electrodes have a multiplicity of thin needle-like extrusions.

11 Claim 16. (withdrawn) A process as set forth in Claim 15 wherein the needle-like  
12 extrusions have diameters between 1 nanometer and 100 micrometers.

13 Claim 17. (withdrawn) A process as set forth in Claim 16 wherein the material in the  
14 turbulent heating zone and the energy retaining zone have micro-porous structure layers  
15 selected from a group consisting of alumina, silica, mullite, titanate, spinel, zirconia, or some  
16 combination thereof.

17 Claim 18 (new). A plasma reformer as set forth in Claim 1 wherein the reaction  
18 chamber is maintained in a temperature range of 400°C to 1900°C.